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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/536,890

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124102

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25944 7590 03/17/2008  
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EXAMINER

CULBERT, ROBERTS P

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

03/17/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/536,890	<b>Applicant(s)</b> ROBERT ET AL.	
	<b>Examiner</b> Roberts Culbert	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 8-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 is/are allowed.
- 6) ☒ Claim(s) 8-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION*****Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/22/08 has been entered.

***Response to Arguments***

Applicant's arguments filed 2/22/08 have been fully considered.

Applicant has argued that Reid and Mathieu alone or in combination fail to teach etching at least one opening in the formation layer up to the level of the front face of the sacrificial layer, and etching the sacrificial layer through the opening such that the suspended structure is suspended over a space whose endpoints are defined by sidewalls of the embedding layer.

However, the arguments are not persuasive in view of the new grounds of rejection. First, Reid teaches patterning an opening in the formation layer (46) and etching the sacrificial layer through the opening since the patterning exposes the sacrificial layer to the etchant. Although Reid does not state that etching is used to for the patterning step, since etching is conventional in the suspended structure fabrication art for patterning such a layer, (i.e. removing a portion) it would have been immediately envisaged by one of ordinary skill in the art as though it were expressly recited by Reid. Second, Reid teaches an array of such devices is conventional. (See Col. 1, Lines 15-33) For example, Huibers (incorporated into Reid by reference) teaches the forming an array of immediately adjacent suspended structures in order to form a micro-mirror array. (See Figures 1-8 and related discussion) It is noted that formation of an array of the suspended structures of Reid results in an array of suspended structures over a space whose endpoints are defined by sidewalls of the embedding layer.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S Patent Application Publication 2002/0047172 to Reid in view of U.S. Patent 5,835,256 to Huibers, and WO 00/33089 A2 to Matheiu et al.**

Regarding Claim 8, Reid teaches a production process of an integrated micro-system type component, (Figures 2A-2G and Paragraphs 19-24) comprising a flat suspended micro-structure, arranged on an embedding layer, the process successively comprising: deposition of a sacrificial layer on a substrate, deposition on at least part of the substrate and on at least part of the front face of the sacrificial layer, of the embedding layer presenting a larger thickness than the thickness of the sacrificial layer, planarization of the embedding layer such that the front face of the sacrificial layer and a front face of the embedding layer form a common flat surface, deposition of a formation layer (46) of the suspended structure on a front face of the common flat surface, patterning at least one opening in the formation layer

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up to the level of the front face of the sacrificial layer, and etching the sacrificial layer through the opening such that the suspended structure is suspended over a space having an endpoint defined by a sidewall of the embedding layer.

Reid does not expressly teach that the patterning the opening in the formation layer comprises etching. However, since etching is conventional for patterning the deposited layer, it would have been an immediately envisaged by one of ordinary skill in the art for patterning the deposited layer, although not expressly recited.

Reid does not expressly teach plural sidewalls defining the space under the suspended structure. However, as taught by Reid, forming an array of adjacent suspended micro-devices such as micro-mirrors is conventional in the art of forming such devices. Although only one suspended structure is shown for illustration, Reid teaches it is conventional to form adjacent suspended microstructures in an array. (See Col. 1, Lines 15-33 and Col. 4, Lines 36-41) For example, Huibers, is incorporated by reference, and teaches a micro-mirror array (Figures 1-8) having immediately adjacent suspended structures. It would have been obvious to one of ordinary skill in the art at the time of invention to form the microstructure of Reid in an array in the conventional manner (i.e. by simply repeating the structure in adjacent fashion). The resulting array of suspended structures produced using the process of Reid would necessarily provide a space defined by plural sidewalls under the suspended structure as recited and illustrated by applicant.

Reid does not expressly teach that a polymer sacrificial layer is dry etched, however, Reid teaches dry etching techniques for the sacrificial layer (Paragraph 23) and photoresist type sacrificial layers (Paragraph 19), and dry etching such as oxygen plasma, is old and well known in the microfabrication art for removing photoresist sacrificial layers as shown by Matheiu et al. (Page 23, Lines 20-30) Thus, it would have been obvious to use dry etching on a polymer material such as photoresist.

Regarding Claim 9, Reid teaches the planarization step comprises chemical mechanical polishing. (Paragraph 23)

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Regarding Claim 10, Reid teaches the planarization step successively comprises a chemical mechanical polishing sub-step of the embedding layer and an etching sub-step of the embedding layer so that the front faces of the sacrificial layer and of the embedding layer form a common flat surface.

Regarding Claims 11 and 12, Reid teaches the side walls of the sacrificial layer are confined by etching by means of a mask formed on the front face of a layer made from polymer material by deposition, lithography and etching of a temporary layer, deposition of the embedding layer being performed on the assembly formed by the sacrificial layer and the mask, but does not expressly teach that the mask is eliminated in the course of the planarization step or that the planarization step comprises an etching step of the mask. However, since Reid teaches patterning the sacrificial layer (Paragraph 23) and teaches that the photoresist mask for patterning is removed in the well known manner, (Paragraph 19) it would have been obvious to one of ordinary skill in the art at the time of invention to eliminate the mask during the planarization step (which comprises an etching step) since this step removes material down to the sacrificial layer thus eliminating a separate removal step for the photoresist mask.

#### ***Allowable Subject Matter***

Claim 13 is allowed.

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571)272-1433. The examiner can normally be reached on Monday-Friday (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roberts Culbert/  
Primary Examiner, Art Unit 1792